

Remarks

By the present amendment and response, Applicants have: canceled claims 1-4, 6, 11, 12, 15-19, 22, 23, 28, 29, 31, 34, 35, and 37-41; amended claims 5, 7, 10, 13, 14, 20, 21, 24, 25, 30, 32, 33, and 36; and added new claims 42-61. Consequently, claims 5, 7-10, 13, 14, 20, 21, 24-27, 30, 32, 33, 36, and 42-61 are pending in the present application with claims 5, 7, 20, 24, 25, 30, and 36 being independent claims. Remarks addressing the objections and §§ 112, 102 and 103(a) rejections contained in the Office Action mailed April 3, 2003 are set forth in turn below.

Objection to the Drawings

The Examiner objected to the drawings because of numerous typographical errors, namely, for failure to include numerous reference signs and figure numbers mentioned in the description.

The original drawings contained numerous inadvertent typographical errors that were apparently caused by translation of the images from one software format to another format within the offices of Applicants' (former) attorneys during preparation of the drawings to be filed with the patent application. The effect of the software translation problem was that a great many reference numbers and figure numbers, and a lesser number of textual entries and symbols such as arrows, were erroneously truncated or omitted.

Applicants recognized the typographical errors in the drawings in late 2001 and (through their former attorneys) submitted a "Proposed Drawing Amendment For Approval by Examiner Pursuant to 37 CFR § 1.121" on December 5, 2001 including

corrections in red ink ("redline drawings") as then required by 37 CFR § 1.121. It appears, however, from the Office Action mailed in the present application on April 3, 2003, that the Examiner never received the Proposed Drawing Amendment dated December 5, 2001. A copy of the Proposed Drawing Amendment and redline drawings, complete with the Certificate of Mailing and return postcard bearing the OIPE stamp dated December 5, 2001, is attached hereto for the convenience of the Examiner – particularly to aid in identifying the errors contained in the drawings as originally filed by Applicants' former attorneys. If the Examiner would like to receive a separate listing of each affected reference number, figure number, textual entry, and symbol, such listing will be provided by the undersigned upon request.

The enclosed Replacement Sheets 1-21 are believed to comply with the present 37 CFR § 1.121 (as amended on July 30, 2003) and 37 CFR § 1.84, and to further address all of the Examiner's drawing objections. No new matter has been added.

Objections to Claims Depending from Rejected Base Claims (Allowable Subject Matter)

Claims 5, 7-9, 20, 24, 26, 27, 30, and 36 were objected to as being dependent upon rejected base claims, but the Examiner indicated that each would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. (Office Action at 11.) In response to the Examiner's statements, claims 5, 7, 20, 24, 30, and 36 have been rewritten in independent form to include all of the limitations of the base claim and any intervening claims, with claims 8, 9, 26, and 27 now being dependent upon these independent claims. Accordingly, withdrawal of the objections to claims 5, 7-9, 20, 24, 26, 27, 30, and 36 is respectfully requested.

Rejection under 35 U.S.C. § 112

Claim 6 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Since claim 6 has been canceled by the present amendment, this rejection is believed to be moot.

Rejections under 35 U.S.C. § 102A. Anticipation by U.S. 6,154,586 to MacDonald, et al.

Claims 1-4, 6, 11-19, 29, 31-35, and 37 were rejected under 35 U.S.C. 102(e) as allegedly being anticipated by U.S. 6,154,586 to MacDonald, et al. ("MacDonald et al."). Since claims 1-4, 6, 11, 12, 15-19, 29, 31, 34, 35 and 37 have been canceled by the present amendment, it is believed that these rejections are moot. Accordingly, further discussion of the § 102 rejections by MacDonald et al. will focus on claims 13, 14, 32, and 33.

By virtue of the present amendment, claims 13, 14, 32, and 33 all depend from claims that the Examiner has indicated would be allowable if rewritten (and thus have been rewritten) in independent form. Specifically, amended claim 13 depends upon amended claim 5, amended claim 14 depends upon amended claim 7, and amended claims 32 and 33 depend upon amended claim 30. Because each of claims 13, 14, 32, and 33 depend upon (and consequently are directed to a narrower subset of) allowable subject matter, withdrawal of the § 102 rejections as to these claims is respectfully requested.

B. Anticipation by U.S. 6,360,776 to Barth, et al.

Claims 22, 23, 25, and 28 were rejected under 35 U.S.C. 102(e) as allegedly being anticipated by U.S. 6,360,775 to Barth, et al. ("Barth et al."). Since claims 22, 23, and 28 have been canceled by the present amendment, it is believed that these rejections are moot.

With regard to claim 25, the Examiner argued that "Barth et al discloses the first liquid is manipulated by inducing a pressure gradient within the channel." (Office Action at 8.) Amended claim 25, however, includes the steps of:

providing a plurality of electrodes in electrical communication with at least one of the first fluid and the second fluid; and
supplying an electric potential to at least one electrode of the plurality of electrodes to induce an electrokinetic or electrophoretic pressure gradient within the microfluidic channel ...

Merriam-Webster's online dictionary (available at www.m-w.com) defines the term *electrokinetic* as "of or relating to the motion of particles or liquids that results from or produces a difference of electric potential", and defines the term *electrophoretic* as "the movement of suspended particles through a fluid or gel under the action of an electromotive force applied to electrodes in contact with the suspension."

The use of electrodes to induce an electrokinetic or electrophoretic pressure gradient is contrary to the teachings of Barth et al., which is directed to a capillary fluid switch filled with a first liquid into which a wall-confined bubble (e.g., vapor or gas) is introduced to achieve a switching event. Devices according to Barth et al. primarily exploit the change in surface tension of a bubble with temperature, thus utilize the principle of thermocapillarity (also known as the Marangoni effect). Barth et al.

discloses the use of electrodes, but only as a "bubble generator 1114" useful to "electrolyze water constituting fluid 1 into a mixture of oxygen and hydrogen gases constituting fluid 2." (Barth et al., col. 20, lines 1-5.) Bubbles in a device according to Barth et al. may be useful as pumping elements, with an expanding bubble capable of acting as a piston to displace surrounding fluid and causing it to move in a direction caused by the capillary geometry. (Id. at col. 1, lines 62-67). Nothing in Barth et al. teaches or suggests the application of electric potential to induce an electrokinetic or electrophoretic pressure gradient. Accordingly, withdrawal of the § 102 rejection of claim 25 is respectfully requested.

C. Anticipation by U.S. 6,445,845 to Sakata, et al.

Claims 38, 39, and 41 were rejected under 35 U.S.C. 102(e) as allegedly being anticipated by U.S. 6,445,845 to Sakata, et al. ("Sakata et al."). Since claims 38, 39, and 41 have been canceled by the present amendment, it is believed that these rejections are moot.

Rejections under 35 U.S.C. § 103

A. Obviousness over U.S. 6,154,586 to MacDonald, et al.

Claims 10 and 21 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable for obviousness over U.S. 6,154,586 to MacDonald, et al. ("MacDonald et al."). By virtue of the present amendment, amended claims 10 and 21 both depend from claims that the Examiner has indicated would be allowable if rewritten (and thus have been rewritten) in independent form. Specifically, amended claim 10 depends upon amended claim 5, and amended claim 21 depends upon amended claim 20.

Because each of claims 10 and 21 depend upon (and consequently are directed to a narrower subset of) allowable subject matter, withdrawal of the § 103 rejections as to these claims is respectfully requested.

B. Obviousness over U.S. 6,445,845 to Sakata, et al.

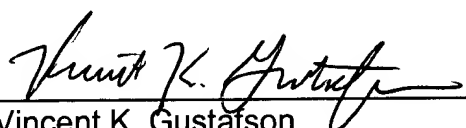
Claim 40 was rejected under 35 U.S.C. 103(a) as allegedly being unpatentable for obviousness over U.S. 6,154,586 to MacDonald, et al. ("MacDonald et al."). Since claim 40 has been canceled by the present amendment, it is believed that this rejection is moot.

Conclusion

By virtue of the amendment and arguments stated herein, Applicants believe that all pending claims 5, 7-10, 13, 14, 20, 21, 24-27, 30, 32, 33, 36, and 42-61 are in good condition for allowance, and respectfully request allowance thereof. If, for some reason, a notice of allowance cannot be envisaged after consideration of the present Amendment, a telephone call with the undersigned at (626) 351-8200 ext. 6503 to discuss any deficiencies would be earnestly appreciated. Consideration of the references contained in the accompanying Information Disclosure Statement is also requested.

Respectfully submitted,

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Vincent K. Gustafson
Reg. No. 46,182

USPTO Customer No.: 32763